preëminence in this inviting field of research. He wrote much for some of the leading natural history periodicals, and his two chief works are "Die Befruchtung der Blumen durch Insecten" and "Alpenblumen; ihre Befruchtung durch Insecten."——At the meeting of the Academy of Science of Paris, September 17, M. J. Chatain gave a description of the olfactory organs which are found on the antennæ of *Vanessa io*.——The imports of raw silk at the ports of New York and San Francisco for the month of October, 1883, reached 2783 bales = $1,726,741. The imports of waste silk and pierced cocoons at same ports, amounted to 50 pkgs. = $14,282.

ECONOMIC NOTES.—It seems that the Treaty of Berne, to which most of the European countries have assented and which prescribes certain regulations as to the transit of plants with a view of preventing the introduction of the grape Phylloxera, has worked satisfactorily, though Holland, Spain and Italy, which were not represented in the treaty, yet find great annoyance from the Phylloxera laws existing on the continent. It is stated in a recent number of the *Gardeners' Chronicle* that thousands of plant packages are lying on the German frontier awaiting instructions. ——Mr. A. J. Caywood, of Marlboro, N. Y., informs us that dry lime liberally and rapidly thrown over the foliage after rain has, in his experience this season, proved effectual against rose-bugs, which came in swarms. It costs fifteen to twenty cents per bushel at the kiln.——The Le Brun prize of 500 fr. and a gold medal, awarded by the Academy of Belles Lettres, Science and Arts of Lyons, every three years, for the most valuable improvement relating to the silk industry, was this year awarded to an American, Edward W. Sewell, Jr., for his automatic silk reel.

ZOÖLOGY.

A NEW VIRGULARIAN ACTINOZOON.[1]—*Radicipe pleurocristatus*, both genus and species, is based upon a peculiar Japanese form, and is described by Mr. Stearns in the Proc. U. S. Nat. Museum, July 27, 1883.[2] It differs from other Virgularians in the arrangement of the polyps, which occur in a single series along one edge of the obtusely quadrangular style, and in the termination of the basal end, which instead of being simple or falciform, as in the species heretofore described, is furcate and root-shaped, pointing to a relationship, and connecting the simple-stalked Virgularians with the sea-fans or Gorgonacea.

The paper also treats of the structure and habits of related forms, and gives a new habitat, the codfishing banks of the Shu-

[1] Description of a new genus and species of Alcyonoid polyp from Japanese waters, with remarks on the structure and habits of related forms, etc., by Robert E. C. Stearns, pp. 96–101.

[2] Also read at the Montreal meeting of the Am. Assoc. Adv. Science, Aug., 1882.

magin islands, Alaska, for the gigantic Virgularian, *Haliptera blakei*, previously described by the author.

OUR FRESH-WATER SPONGES.—It is just twenty years since the first extended synopsis of the fresh-water sponges was published by Dr. Bowerbank (Proc. Zoöl. Soc. London, Nov. 24, 1863) including descriptions of twenty-one species. In 1842, twenty-one years before, Dr. Johnston's "History of British Sponges, &c." described but two fresh-water forms under the names of *Spongilla lacustris* and *Spongilla fluviatilis*. These names had then long been applied to two supposable species, though no better line of distinction had been drawn between them than the differing localities in which they were believed to be generally found. In Johnston's work also the descriptions fail clearly to distinguish the species, and his illustrative figures appear to have both been taken from specimens of *Spongilla lacustris*. Three years earlier, however (1839), Meyen had pointed out an essential difference between them, independent of their locality and general form; and it is a curious fact that the name *S. lacustris* was finally attached to the sponge which, in this country at least, affects rapidly flowing streams, and *S. fluviatilis* to the one which prefers the still waters of our lakes and pools.

The difference (in the character of their statoblast spicules) observed by Meyen between these early known forms, as further studied by H. J. Carter, Esq., F.R.S., among the other representatives of this growing family, became the basis of a new classification by the latter ("History and Classification of the known species of Spongilla," *Ann. and Mag. of Nat. Hist.*, Feb., 1881); and this excellent monograph, covering about thirty recognized species, stands as our latest authority on the subject.

The labors of a few workers during the last four years have added two well marked genera and a dozen or more American species to this list, and commenced the accumulation of a mass of information as to their habits and distribution, that can hardly fail to prove of value.

However meager may be the number of species in European and other foreign waters, it is plain that in America these sponges exist in many varied forms which should be classified and described. The circular somewhat widely distributed during the past summer with a view to invite contributions of sponges from localities which the writer could not personally visit, has been, thus far, quite disappointing in its results. Some contributions, however, have been received from those zealous workers, Mr. Henry Mills, of Buffalo, and B. W. Thomas, of Chicago, and from Professor E. D. Cope, H. Allen, J. Gibbons Hunt, and a few others. The collection made by Professor J. G. Hunt from the waters of Moosehead lake in the State of Maine, is the finest, for the size and symmetry of its specimens, yet noticed. Some of the streams in the New England and Middle States have been

peeped into, but the waters of the South are yet unexplored, while those of the West are but meagerly represented.

A few suggestions, growing out of the experience of the writer during the past three or four years, may be useful in promoting further effort.

As a rule, though as usual with some exceptions, fresh-water sponges *growing exposed to the light* are green, from the inclusion of chlorophyl granules; but *all* sponges do not habitually expose themselves to the light, and the collector who merely gathers what may be seen as his boat glides over them, or as he walks along the bank of stream or pond, will miss some of the most interesting forms. Again, the size of a mass of sponge depends, other things being equal, upon the length of time it has colonized, so to speak, the particular location upon which it is found. It is believed, from the writer's observation, that the contents of a single statoblast will rarely develop in one year into a sponge of a size likely to attract attention, and at the end of the season it dies, the sarcode slime disappears, and in many, perhaps most cases, the majority of its skeleton spicules are washed away. Before dying, however, there will have been formed, within its meshes, from one to a dozen or more reproductive bodies—the statoblasts or winter eggs of the sponge—of which number we may presume that an average of half a dozen may withstand the chances of the following winter, and, germinating in the spring, their contents coalescing, will reclothe with a growth of sarcode the persistent spicules, and form others, so that the resultant mass will, at the end of the second year, be at least six times as large as its ancestor of the year before. Increasing year by year in something like this ratio, a few seasons of comparatively undisturbed growth, will give us a sponge several inches in diameter, which may be the product of hundreds or thousands of statoblasts.

In this part of the country, so far as observed in the limited experience of the writer, the only sponges likely to be found of large dimensions, are the American representatives of the two original European species, now known as *Spongilla lacustrioides* and *Meyenia fluviatilis*, and the equally widely distributed species discovered and named by Dr. Leidy in 1851, *Spongilla fragilis*. All of these, beginning their lives where floating statoblasts may have lodged, upon the under side of stones, submerged branches or timber, are there found to be colorless or of a light yellow tinge; but soon creeping around upon the edge and to the upper surface, assume a light and ultimately a dark-green color; the first species particularly and to a less degree the others, seeming to rejoice in the full sunlight.

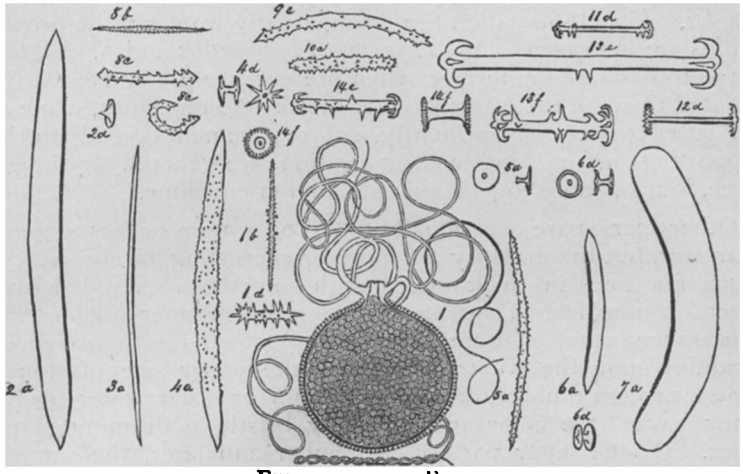
Though it is seldom safe to determine the species of a sponge from its general form, or from surface indications merely, it will

do to *guess* that a strongly-growing specimen with clearly self-sustained branches, belongs to the very variable species *S. lacustrioides*. If statoblasts are few or apparently wanting, the probabilities are increased. As between *M. fluviatilis* and *S. fragilis*, the statoblasts of the former, when present, are pretty evenly distributed through the interspaces of the skeleton spicules, while in the latter they occupy, primarily, a close pavement layer upon the supporting surface; and in *other* positions are generally grouped, three, four or more together, in a common envelope.

Other species are occasionally found of a more or less massive character, but the majority are filmy or encrusting, rarely exceeding a few lines in thickness, though sometimes extended over several square feet of surface. During the summer season their appearance is that of more or less slimy growths in their favorite localities upon the under, sometimes the upper side of stones, roots or rotten timbers, or on Sphagnum or other water plants. They have little color and generally bristle with minute spicules. By the latter part of September and later, the sarcode of many of these colonies and often a large portion of their skeleton framework, will have disappeared, leaving only detached groups of minute statoblasts adherent to the supporting substance, biding their time for a new growth the coming season. The successes of the writer have been largely found in his explorations of such localities, and in the collection and examination of this class of material. From a boat or while wading with rubber boots in shallow water, old timbers, stumps, &c., may be turned over, frequently revealing numbers of these groups for the delectation of the enthusiast. A secondary pleasure may be communicated and the species will be identified if specimens are sent to the undersigned. They should be clipped off and preserved in alcohol or allowed to dry thoroughly, otherwise they will soon mold.

Additional zest may be added to the search for these objects by the suggestion of a simple method of preparing them for microscopic examination. As, according to Carter's system, the classification largely depends upon the character of the spicules surrounding the statoblasts, his method of making these visible may be briefly stated: "Place a few of the statoblasts upon the center of a micro-slip, cover them with a drop of nitric acid and evaporate it off over a low flame. Repeat with a second or even a third drop when necessary to produce the required transparency. Remove the remaining acid by slowly trickling water over the inclined slide. Dry perfectly without using much heat, and apply balsam and a cover-glass. If the statoblasts now contain bubbles of air, these may generally be driven out by careful heating, when some of the most interesting and characteristic features of the sponge will be disclosed. A few of the characteristic forms of

spicules, &c., of American sponges, are shown in the following cut:



EXPLANATION OF FIGURE.

The accompanying figures are drawn from nature by the aid of the camera lucida, and represent the relative sizes and shapes of *like parts* of several sponges. The statosphere is magnified 35 times, the spicules of the skeleton, marked *a*, 150 times, all other figures 225 times.

1. *Carterius tenosperma*—Section of statosphere. (In the other genera these are without tendrils.) *b*, dermal or flesh spicule; *d*, birotulate spicule of outer coat of the statosphere.
2. *Parmula Batesii*—*a*, skeleton spicule; *d*, parmuliform spicule of statosphere.
3. *Spongilla montana*—*a*, skeleton spicule.
4. *Meyenia fluviatilis*—*a*, skel. spicule; *d*, birotulate stat. spic. and disk of rotule.
5. *Tubella Pennsylvanica*—*a*, skel. spic.; *d*, inequibirotulate spic. of statosphere and disk.
6. *Meyenia Leidii*—*a*, skel. spic.; *d*, birotulate stat. spic. and disk.
7. *Uruguaya corallioides*—*a*, skel. spic.
8. *Spongilla lacustrioides*—*b*, dermal spic.; *c*, stat. spic.
9. *Spongilla fragilis* var. *minuta*—*c*, stat. spic.
10. *Spongilla fragilis*, var. *Calumeti*—*c*, stat. spic.
11. *Meyenia crateriforma*—*d*, birot. stat. spic.
12. *Meyenia Everetti*—*d*, birot. stat. spic.
13. *Heteromeyenia argyrosperma*—*e. long*, *f*, *short*, birot. stat. spic.
14. *Heteromeyenia Ryderi*—*e*, long, *f*, short, birot. stat. spic.

—*Edward Potts, 228 S. Third street, Philad'a, Pa.*

PYRGULA NEVADENSIS.[1]—This is the name given to a new Hydrobiinoid mollusk inhabiting Pyramid and Walker's lakes in the Sierra Nevada mountains, by the author.

The species of Pyrgula heretofore described, are the types *P. helvetica* from Switzerland; *P. bicarinata*, France; *P. pyrenaica* from the Pyrenees, and *P. andicola* from the Andes of Bolivia.

[1] Description of a new Hydrobiinoid Gasteropod from the mountain lakes of the Sierra Nevada, with remarks on allied species and the physiographical features of said region, by Robert E. C. Stearns, in Proc. Phil. Acad. Nat. Sciences, 1883, pp. 171-176.

Its distribution hitherto, it will be seen, is Europe and South America; inhabiting fresh waters in mountainous regions, and it is interesting to notice that all the species of the genus as yet described occur in mountainous districts, an instance of correlation of form to external conditions.

Pyramid lake, although it receives the fresh water of the Truckee river, the outlet of that gem of lakes, Tahoo, is very strongly alkaline, and the water is not good for human use, although it can be used for a short period without much inconvenience.

The elevation of Pyramid lake is 4890 feet, and Walker's lake has an altitude of 3840 feet; the water is brackish.

These lakes are the remnants of the great Tertiary lake which covered this general region, and are the pockets or deeper depressions in the floor of the ancient lake.

Pyrgula nevadensis is a small shell, of five to six whorls, which are traversed spirally by a single strong keel or carina. It is white, smooth and glossy, and measures eighteen-hundredths of an inch in length by about half as much in breadth. It occurs also in a calcareous deposit with Pompholyx, another curious form, as well as in the dredgings.

Sexual Characters of Limulus.—It has often been puzzling to account for the fact that no cast-off shells of the Limulus, bearing the characteristic modified claw of the male, could be found along the sea-coast, at least I have never been able to find one, while the shells of what are generally supposed to be the young female are very abundant. During the past five years I have examined at least one thousand specimens along the shores of Long Island sound, about New Haven, and Vineyard sound, at one time collecting over one hundred during a single afternoon at Savin Rock, for the National Museum; and among all of these not a single specimen with the modified claw was found.

Good naturalists have told me that they have found them, but it is very possible that if they had examined carefully it would have resulted as it has with me in a large number of cases, viz., that they were dead animals and not cast-off skins.

At first thought it appeared that the males must be exceedingly few in number compared with the females, but this was found to be incorrect, as the living and dead males are often found, perhaps quite as often as the grown females.

During the past summer, in our shore trips from the U. S. Fish Commission laboratory at Woods Holl, Mass., I collected a large number of cast-off shells of the Limulus, also a few small living specimens, none of which possessed the modified claw of the male. (Fig. 1 B shows the well-known claw of the male, and A that of the female, both natural size.)

Upon further examination it was found that the genital openings, located on the under side of first pair of abdominal appen-

dages, are a sure distinguishing character of the sexes, even in

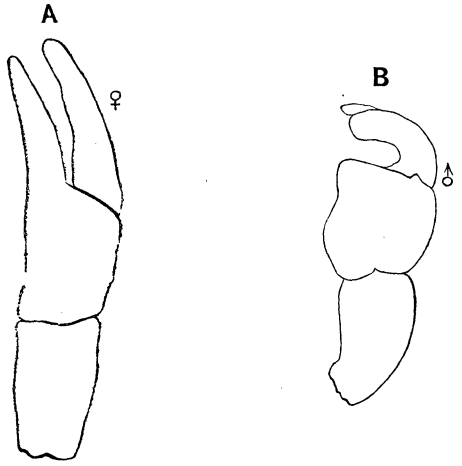


FIG. 1.—A, female, and B corresponding male claw of Limulus.

the very youngest. (Fig. 2 A represents those of the female, and B those of the male, both natural size.)

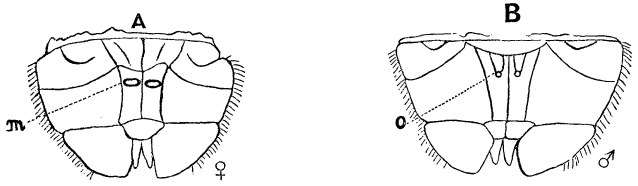


FIG. 2.—First Abdominal feet of male and female Limulus.

As here represented the openings of the oviduct in the female are transverse slits (Fig. 2 *m*), while the genital openings of the male (Fig. 2 *o*) are two papillæ with circular openings at the ends.

Of thirty-five exuvia and living specimens, varying from one to four inches in diameter, which were examined and the record kept, seventeen were males and eighteen were females, while none of them possessed the modified claw of Fig. 1 B, there being no essential difference in the hand and opposable thumb of the male and female.

These facts show that the male Limulus, while young, has the claws of the second pair of thoracic appendages like those of the female, and does not take on this modified form till well grown, and further, that it is possible that he never sheds his shell after this modified claw is acquired, because, as stated above, of over one thousand specimens examined, not a single specimen possessing this character was found. Further, we are led to believe that large Limuli rarely, possibly never, shed, because among all those examined, there were no large exuvia.

Of the living and dead specimens examined, the females were the largest, some measuring ten or twelve inches, and occasionally even more, across the carapax, and the males eight to ten inches in width. And the carapax of these large animals is usually overgrown with algæ and appear rusty and aged, while those of the small and medium sized Limuli are bright and clean, apparently kept so by their frequent shedding, but just how often this takes place is not definitely known. Doubtless they shed several times during the first year after hatching, for we have all stages, from the egg up through the tailless forms to the perfectly-formed Limulus, and all these certainly belong to the young of this year.

The increase in size at the time of shedding is remarkable. At the laboratory of the U. S. Fish Commission, at Woods Holl, Mass., during the summer of 1882, I found a small Limulus and placed it in an aquarium, and the next day found that it had shed during the night. It did not occur to me to make measurements of the exuvia and young animal till after they had been placed in alcohol, hence the results are not so reliable as some measurements made of fresh specimens at Woods Holl, this summer, by Professor S. I. Smith.

The first was reared by Mr. Bruner, and, as we supposed, was the second molt after hatching, and the second was of my own rearing, and was the third molt; the third are the measurements secured by myself a year ago.

No. 1. Aug. 3, 1883.

	Exuvia.	Young.
Entire length	4.0mm	7.1mm
Length of carapax	2.0 "	3.1 "
Breadth of carapax	3.5 "	5 4 "
Breadth of abdomen	2.7 "	4.0 "
Breadth between eyes	2.5 "	3.2 "
Length of tail	0 2 "	1.6 "

No. 2. Aug. 20, 1883.

	Exuvia.	Young.
Entire length	7.0mm	10.5mm
Length of carapax	3.0 "	4.2 "
Breadth of carapax	5.5 "	7.5 "
Breadth of abdomen	3.9 "	5.1 "
Breadth between eyes	3.3 "	4.0 "
Length of tail	1.8 "	3.4 "

No. 3. Aug. 26, 1882.

	Exuvia.	Young.
Entire length	29.0mm	40.0mm
Length of carapax	11.5 "	20.0 "
Breadth of carapax	17.5 "	22.5 "
Breadth of abdomen	13.2 "	16.5 "
Breadth between eyes	10.0 "	13.5 "
Length of tail	10.1 "	17.2 "

—B. F. Koons, Storrs Agricultural School, Mansfield, Conn., Oct. 9, 1883.

A NEW SNAKE FROM NEW MEXICO.—*Atomarchus multimaculatus*, gen. et sp. nov. Group Homalopsinæ, related to Tropidonotus.

Char. Gen.—Teeth isodont; anal scute entire; three internasal, and two nasal plates; loreal present; scales carinate, poreless.

Char. Specif.—Scales in twenty-one rows, all keeled excepting the inferior one. Superior labials eight, all low and rather long, the orbit bounded by the fourth, and cut off from the fifth by the inferior postocular. Loreal low, much longer than high. Preoculars two, both subquadrate; the superior the larger; the inferior resting on the fourth superior labial. Postoculars three, the median the smallest (the apex of the inferior cut off to form a fourth on one side). Temporals 1–3, the anterior large, bounding the sixth and seventh labials above. Rostral not prominent, wider than deep, truncate above. Internasals longer than wide, separated in front, and from the rostral by a pentagonal azygos plate. Frontal narrow, with concave sides, the anterior angles touching the superior preoculars. Superciliary plates convex, subtriangular, and nearly acute in front. Parietals elongate, posteriorly acute and much divaricate. Muzzle quite narrow, eyes directed laterally.

Color above ash-gray, with six or seven longitudinal series of brown spots. Those of the median two or three rows are sometimes united, forming short cross-bars. Those of the inferior series are on the first row of scales and are blacker than the others. Below cream-colored ashen, with irregular black blotches on the anterior part of each scutum. Tail nearly uniform ash above and below, excepting a blackish line along the junction of the scutella. Throat yellow; inferior labials yellow with blackish posterior borders; superior labials less bright yellow with brown posterior and superior borders. Top of head brown, with darker brown markings, as follows: A dark shade in the middle of each parietal; a narrow × opening forwards on the frontal; a longitudinal line on each superciliary, and a transverse waved line across each prefrontal.

Total length, M. .708; do. of rictus oris, .021; do. of tail, .171.

I caught this snake in a net while fishing in the San Francisco river, New Mexico, on the ranch of Mr. H. C. Wilson, which is near the boundary line of Arizona. In its characters it is quite unique, combining the entire anal plate of Eutænia with the dental characters of Regina B. & G., and a third internasal plate, a character rarely met with in serpents. The only North American snake to which it bears any resemblance is *Tropidonotus taxispilotus* Holbr. It is a good swimmer, and is doubtless piscivorous, like other water snakes.

I here take occasion to record my obligations to Mr. H. C. Wilson, without whose aid I should not have had the opportunity

of making the excursion on which I took this snake and other interesting objects.—*E. D. Cope.*

HABITS OF THE AYE-AYE.—Little is known of the habits of this creature, as it is a nocturnal animal. Rev. G. A. Shaw sends a few rough notes regarding it to the Zoölogical Society of London, which appears in its Proceedings. He says: "This curious animal (*Chiromys madagascariensis*) has evidently been named from the exclamations of the people who first saw it, and who, upon first sight of anything so peculiar, would naturally utter the usual Malagasy exclamation of surprise, Hay! Hay! And at the present time among the people it is called the Haihày (pronounced Hayehaye)." Native reports are contradictory as to its habits in a wild state, especially as to its food. In confinement it likes bananas and eats small fruits of various native shrubs, as also rice boiled in milk and sweetened with sugar, but meat, larvæ, moths, beetles and eggs it would not touch. "It did not hold its food in its hands as the lemurs which I have had in captivity have done, but merely used its hands to steady it on the bottom of the cage. But whenever it had eaten, although it did not always clean its hands, it invariably drew each of its long claws through its mouth, as though, in the natural state, these had taken a chief part in procuring the food." While some writers state that the haihay is easily tamed and inoffensive, Mr. Shaw's experience taught him that it was "very savage, and when attacking, strikes with its hands, with anything but a slow movement. As might be imagined in a nocturnal animal, its movements in the day time are slow and uncertain, and it may be said to be inoffensive then." A number of superstitious beliefs are connected by the natives with it.

ZOOLOGICAL NOTES. — *General.* — MM. P. Regnard and R. Blanchard have recently studied the respiratory capacity of animals of aquatic habits, with results that corroborate those of M. Paul Bert. If the respiratory capacity of the monitor (*Varanus arenarius*) be placed at 5, it is equal to 8.4 in the alligator. Among birds the respiratory capacity of the common fowl is 12, while that of the duck is 18, and among mammals that of the dog is to that of *Phoca vitulina* as 25 is to 37.8. Thus the following is formulated as a law: "An animal accustomed to exist a long period without taking breath will, thanks to the richness of its blood in hemoglobine, take in an extra store of oxygen on which to live.——M. Merejowsky contributes to the Bull. Soc. Zool. de la France the results of recent researches on zoönerythrine and other animal pigments. A list of the species in which that naturalist has noted the presence of zoönerythrine includes several members of each of the following sub-kingdoms and classes: Cœlenterata, Vermes, Bryozoa, Echinodermata, Mollusca, Tunicata, Crustacea and Pisces, in all 117 species. Zoön-

erythrine is usually found in the superficial layer, but in some species it occurs in the muscular tissue. Various phanerogamous and cryptogamous plants also contain it. Numerous other pigments are enumerated. One group of these is characterized by the ease with which they can be transformed into zoönerythrine under the influence of certain chemical or physical conditions, such as elevation to the boiling point, or the addition of a drop of acid, while another group is characterized by the impossibility of transforming them into zoönerythrine.——J. Kollman (Zool. Anzeiger, Oct., 1882) argues in favor of the double nature of the excretory organs of the Craniota. The transverse canals are probably homologous with the segmental organs of annelids, but this does not apply to the unsegmented longitudinal canals, which have a distinct origin and become afterwards connected with the transverse canals.

Fishes.—The fishes of that part of the west coast of Africa comprised between Cape Palmas and Cape Lopez are not yet well known. The most recent addition to our knowledge is the result of the researches of M. Maurice Chaper upon the Gold coast, and consists of thirteen species, four marine and nine fresh-water. Of the latter four species are new, and are described by M. Sauvage in the Bull. de Soc. Zoologique, 1882.——Dr. R. Blanchard has made numerous observations upon the action of the secretion of the pyloric processes of fishes, with a view to ascertain whether they fulfilled in any way the office of a pancreas. His experiments were conducted at Havre upon ten species of fishes: *Alosa finta, Merlangus pollachius, Merlucius vulgaris, Gadus luscus, Trachinus draco, Trigla pini, T. corax, T. lineata, Trachurus trachurus* and *Zeus faber*, and the invariable result was to the effect that the secreted fluids transforms starch into glucose, and albuminoids into peptones. They are therefore partial representatives of a pancreas, but have no action upon fats.

Reptiles.—The list of the Batrachia and Reptilia of Illinois, prepared by Messrs. N. S. Davis and F. L. Rice, includes seventy-four species of reptiles and thirty-two of batrachians, or nearly one-third of the forms found in the United States. The finding in Northern Illinois of an example of *Siren lacertina* is rather startling.——F. Müller has contributed to the Catalogue of the Basle Museum an account of the distribution in Switzerland of the two species of viper, *Vipera aspis* and *V. berus*. The latter species appears to occupy the eastern and north-eastern portions of the country, while the former is distributed in the west and along the southern frontier.

Birds.—Professor Huxley (Proc. Zoöl. Soc.) has shown that the respiratory apparatus of the Apteryx differs from that of other birds chiefly in the greater size and lesser complexity of the canals, the rudimentary state of the pneumatic sac and the con-

siderable development of the aponeurotic expansions; all peculiarities which approach the reptiles. There is nothing resembling the diaphragm of mammals.

PHYSIOLOGY.[1]

THE NEW CORPUSCLE OF THE BLOOD AND ITS RELATION TO COAGULATION.—It was the view of Alex. Schmidt that the fibrin of clotted blood was a compound formed by the union of two fibrin factors, fibrinoplastin and fibrinogen, under the influence of a third body, fibrin ferment. A number of reasons led to the belief that one or more of the bodies necessary to the formation of fibrin was derived from disintegrated white blood corpuscles. Schmidt taught that fibrinoplastin and fibrin ferment owed their origin to the breaking down of white blood corpuscles or allied forms, while fibrinogen was present in normal circulating blood plasma.

Later, Hammarsten claimed that the whole of the fibrin was derived from fibrinogen alone under the action of the fibrin ferment, and both of these bodies were products of disintegrated leucocytes. Of late years a number of observers have independently described, in accounts which agree more or less perfectly, a morphological element of the blood which differs in its characters from both the white and the red corpuscles.

Bizzozero, whose paper was awarded the prize offered by an Italian scientific society for the most valuable contribution to our knowledge of the causes of the coagulation of the blood, describes this third morphological element of the blood as a colorless disk or lens-shaped body with a diameter equal to one quarter to one half that of a red corpuscle. He states, in opposition to Hayem, that these "plates" are not biconcave and are perfectly destitute of hæmoglobin. Laker states that the disks, while devoid of color, are biconcave in shape, but agrees with Bizzozero that they cannot be considered an intermediate stage in the development of red corpuscles. Laker gives the following method for obtaining a view of the colorless plates: Place a drop of Hayem's preservative fluid on the microscope slide and a drop of blood upon the cover glass and lay the latter upon the slide so that the edges of the two drops shall come into contact; then by means of a slip of filter paper at the side of the cover glass opposite to the drop of preservative fluid, remove as many of the red corpuscles as possible; or, place the two drops upon the slide and lay the cover glass on from the side of the preservative fluid, then drain. The formula for Hayem's preservative liquid is, distilled water 200 parts, sodium chloride 1, soda 5, sublimate 0.5 or osmic acid 1 per cent. Norris, who claims to have described the colorless disks under the name of "invisible corpuscles" as far back as 1878, commonly studies the drop of pure

[1] This department is edited by Professor HENRY SEWALL, of Ann Arbor, Michigan.